

# Isabella Birindelli

## Curriculum Vitae et Studiorum

### Generalities

Born in Dunkerque (France) 31/03/1963, Nationality: italian.  
Married, one child.  
Professional Address: Istituto Matematico "G. Castelnuovo".  
Università di Roma "La Sapienza".  
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### Education

- **Ph.D. in Mathematics.**  
Courant Institute of Mathematical Sciences, N.Y.U., New York, U.S.A.  
September 1987-September 1992.  
Thesis :*Second order elliptic equations in general domains: Hopf's lemma and Anti maximum principle* .  
Advisor: Louis Nirenberg.
- **Laurea (Master) in Mathematics**, 110/110 Magna cum Laude.  
Università degli studi di Roma "La Sapienza". January 1987.  
Advisor: Umberto Mosco.

### Positions

- March 2007 Professore ordinario (Full professor) Università di Roma "La Sapienza"
- Ottobre 2004 Idoneo to position of "Professore Ordinario"
- November '98-March2007:  
*Associate Professor* at the Università di Roma "La Sapienza" member of the Mathematical Department, confirmed in 2001.
- March '92-November '98:  
*Researcher* at the Università di Roma "La Sapienza", member of the Mathematical Department
- '90-'92 Teaching Assistant, N.Y.U.

## Research field

Fully non linear elliptic PDE, spectral properties, maximum principle, regularity. Elliptic, degenerate elliptic and systems of partial differential equations, in particular I have studied qualitative properties, regularity, existence and non-existence theorems in the semi-linear, quasi-linear and linear cases.

## Invited speaker at the following conferences and institutions (last 5 years)

- August 2015, Current trends in Analysis and PDE, IMPA, Rio de Janeiro, Brazil
- March 2015, Non linear PDE at the end of the world, Universidad de Magallanes, Punta Arenas, Chile
- February 2015, Spectral theory and shape optimization problems for elliptic PDEs, Milano Bicocca
- November 2014, Numerical methods for PDEs: optimal control, games and image processing, Sapienza, Roma
- Aout 2014, DFDE, Moscow
- Juillet 2014, ICMAT, Madrid
- Juin 2014, A meeting with L. Nirenberg, RISM
- March 2013, Universit de Tours, invited by Barles
- March 2013, EHESS, Paris.
- January 2013, A. Ma.Ca, Rome.
- June 2010, Ecole Normale Supérieure, "Fronts and Nonlinear PDE's" in honor of H.Berestycki
- January 2010, CIRM, "Analyse géométrique" in honor of Rafe Mazzeo
- December 2009, Courant Institute, NYU, New York
- December 2009, Siam Conference, Miami
- June 2009, INDAM school on Symmetry and elliptic PDE.

## Other recent research-related activities

- Co-Organizer of the conference "Mostly maximum Principle" in Agropoli, september 2015.
- Member of the scientific committee of Gruppo Nazionale Analisi Matematica, Probabilità e Applicazioni, INDAM

- Scientific Committee "Nonlinear elliptic PDEs at the End of the World" Punta Arenas, March 2015
- Co-Organizer of the conference "Mostly maximum Principle" in Rome, september 2012.
- Co-Organizer of the conference "Positivity: a key to fully-nonlinear equations" in Vietri, May 2010.
- Invited professor in many important universities: Cergy-Pontoise, Paris X, University of Chile, Stanford University, Rutgers University, Berkeley
- Reviewer for the "Mathematical Review"
- Referee for many journals including "Inventiones Mathematicae" "Journal IHP, Analyse non linéaire", "Communication in Partial Differential Equations", "Journal of European Mathematical Society", "Proceedings of the Royal Society of Edinburgh", "Pacific Journal", "Annali di Pisa", "Non Linear Differential equations and applications", "Nonlinearity" ...
- Responsible of many research grants from Sapienza Univeristy, CNR, and GNAMPA

### Scientific publications

1. with **F. Leoni** *Symmetry minimizes the principal eigenvalue: an example for the Pucci's sup operator*, Mathematical Research Letters (2014).
2. with **F. Demengel** *Hölder regularity of the gradient for solutions of fully nonlinear equations with sublinear first order terms*, COCV (2014)
3. with **F. Demengel** *Overdetermined problems for some fully non linear operators*. Comm. Partial Differential Equations 38 (2013), no. 4, 608-628.
4. with **F. Demengel** *Regularity for radial solutions of degenerate fully nonlinear equations*. Nonlinear Anal. 75 (2012), no. 17, 6237-6249.
5. with **E. Valdinoci** *On the Allen-Cahn equation in the Grushin plane: a monotone entire solution that is not one-dimensional*. Discrete Contin. Dyn. Syst. 29 (2011), no. 3, 823-838.
6. with **F. Demengel** *One-dimensional symmetry for solutions of Allen Cahn fully nonlinear equations*. Symmetry for elliptic PDEs, 115, Contemp. Math., 528, Amer. Math. Soc., Providence, RI, 2010
7. with **S. Patrizi** *A Neumann eigenvalue problem for fully nonlinear operators* Discrete and Continous Dynamical Systems, volume speciale (2010) special volume for L. Nirenberg.
8. with **F. Demengel** *Eigenfunctions for singular fully nonlinear equations in unbounded domains* Nonlinear Diff. Equations. and Appl. (2010)

9. with **F. Demengel** *Regularity and uniqueness of the first eigenfunction for singular fully non linear operators* Journal of Differential Equations (2010)
10. with **F. Demengel** *Uniqueness of the first eigenfunction for fully nonlinear equations: the radial case* Zeitschrift für Analysis und Ihre Anwendungen, vol. 29, (2010) p. 77-90.
11. with **F. Ferrari, E. Valdinoci** *Semilinear PDEs in the Heisenberg group: the role of the right invariant vector fields.* Nonlinear Analysis vol. 72 (2010) p. 987-997.
12. with **F. Demengel** *Eigenvalue and Dirichlet problem for fully-nonlinear operators in non smooth domains* Journal of mathematical Analysis and its applications, vol. 352 (2009) p. 822-835,
13. with **R. Mazzeo** *Symmetry for solutions of two-phase semilinear elliptic equations on hyperbolic space*, Indiana University Mathematical Journal, vol 58 (2009).
14. with **E. Valdinoci** *The Ginzburg-Landau equation in the Heisenberg group*, Communications in Contemporary Mathematics (2009).
15. with **F. Demengel**, *The Dirichlet problem for singular fully nonlinear operators.* Discrete Contin. Dyn. Syst. 2007, Dynamical Systems and Differential Equations. Proceedings of the 6th AIMS International Conference, suppl.,
16. with **B. Stroffolini**, *Existence theorems for fully nonlinear equations in the Heisenberg group.* Subelliptic PDE's and applications to geometry and finance, 49–55, Lect. Notes Semin. Interdiscip. Mat., 6, Semin. Interdiscip. Mat. (S.I.M.), Potenza, 2007.
17. with **F. Demengel**, *Eigenvalue, maximum principle and regularity for fully non linear homogeneous operators.* Commun. Pure Appl. Anal. 6 (2007), no. 2, 335–366.
18. with **F. Demengel** *First eigenvalue and maximum principle for fully nonlinear singular operators.* Adv. Differential Equations 11 (2006), no. 1, 91–119.
19. with **F. Demengel** *Comparison principle and Liouville type results for singular fully nonlinear operators.* Annales de Toulouse (2004)
20. *Homogenization of Hamilton-Jacobi equations in the Heisenberg group* con J. Wigniolle, Comm. in Pure and Applied Analysis (2003)
21. with **F. Demengel** *Existence of solutions for semi-linear equations involving the  $p$ -Laplacien : the non coercive case* Calculus of Variation (2004)
22. with **F. Demengel** *Sur les équations de Lane-Emden avec opérateurs non linéaires.* (French) [Lane-Emden equations with fully nonlinear operators] , C. R. Math. Acad. Sci. Paris 336 (2003), no. 9, 725–730.
23. with **E. Lanconelli** *A negative answer to a one-dimensional symmetry problem in the Heisenberg group* Calculus of Variation.(2005)

24. with **F. Demengel** *Existence of solutions for semi-linear equations involving the  $p$ -Laplacien : the non coercive case*, Calculus of Variation (2004).
25. with **F. Demengel** *Some Liouville theorems for the  $p$ -Laplacian* Proceedings of the 2001 Luminy Conference on Quasilinear Elliptic and Parabolic Equations and System, 35–46 (electronic), Electron. J. Differ. Equ. Conf., 8.
26. with **F. Demengel** *On some partial differential equation for non coercive functional and critical Sobolev exponent.* Differential and Integral Equations 15 (2002), no. 7, 823–837.
27. with **E. Lanconelli** *A note on one dimensional symmetry in Carnot Groups*, Atti Accad. Naz. Lincei Cl. Sci. Fis. Mat. Natur. Rend. Lincei (9) Mat. Appl. 13 (2002), no. 1, 17–22.
28. *Superharmonic functions in the Heisenberg group: estimates and Liouville theorems* NoDEA Nonlinear Differential Equations Appl. 10 (2003), no. 2, 171–185.
29. *One dimensional symmetry in the Heisenberg group* with J. Prajapat Annali della Scuola Normale Superiore di Pisa, 2001
30. *A note on one-dimensional symmetry in Carnot groups* with E. Lanconelli, to appear Rendiconti Accademia Nazionale Lincei.
31. *Monotonicity results for Nilpotent stratified groups* with J. Prajapat, Pacific Journal. Pacific J. Math. 204 (2002), no. 1, 1–17
32. *Bifurcation problems for superlinear elliptic indefinite equations* with J. Giacomoni, Topological Methods in Nonlinear Analysis (2000)
33. *Morse Index and Liouville Property for Superlinear Elliptic Equations on the Heisenberg group* with I. Capuzzo Dolcetta, Contributions in honor of the memory of Ennio De Giorgi (Italian). Ricerche Mat. 49 (2000), suppl., 1–15.
34. *Nonlinear Liouville theorems in the Heisenberg group via the moving plane method* with J. Prajapat, Comm. Partial Differential Equations (1999)
35. *Existence and numerical approximation results for a class of quasi-linear elliptic system arising in image segmentation* with S. Finzi Vita, No DEA(1998).
36. *Existence of the principal eigenvalue for cooperative elliptic systems in a general domain*, with E. Mitidieri e G. Sweers, Differential Equations-Differentil'nye Uravnenija (1998)
37. *Liouville theorems for elliptic inequalities and applications*, with E. Mitidieri, Proceedings of the Royal Society of Edinburgh, vol 128A (1998)
38. *Indefinite semi-linear equations on the Heisenberg group: a priori bounds and existence*, with I. Capuzzo Dolcetta e A. Cutrı, Communications in Partial Differential Equations, **23**, (1998).
39. *Nonlinear Liouville theorems*, Proceedings of the Meeting Reaction Diffusion Systems, Lecture Notes in Pure and Applied Mathematics, Marcel Dekker Inc.(1997)

40. *Liouville theorems for semilinear equations on the Heisenberg group*, with I. Capuzzo Dolcetta and A. Cutrí, *Annales de l'Institut Henri Poincaré-Analyse non linéaire*, **vol 14**, 3 (1997).
41. *Periodic solutions for a class of second order systems with a small forcing term*, *Nonlinear Analysis* **Vol 27** (1996).
42. *A semi-linear problem for the Heisenberg Laplacian*, with A. Cutrí, *Rendiconti del Seminario dell'Università di Padova* **Vol.** , (1996).
43. *Hopf's lemma and Anti-maximum Principle in General Domains*, *Journal of Differential Equations*, **Vol. 119**, (1995).
44. *Non linear two-obstacles problems: Pointwise regularity*, with M.A. Vivaldi, *Rendiconti di Matematica, Serie VII* **Vol. 14** , (1994).
45. Ph.D. thesis at the Courant Institute: *Second order elliptic equations in general domains: Hopf's lemma and Anti maximum principle* (1992)
46. *Energy decay for Dirichlet problems in irregular domains with quadratic Hamiltonian*, *Integral and differential equations*, **Vol 8**, (1992).

## Preprints

1. **with F. Demengel** Fully nonlinear operators with Hamiltonian: Hölder regularity of the gradient.
2. **with F. Camilli, I. Capuzzo Dolcetta** On the approximation of the principal eigenvalue for a class of nonlinear elliptic operators
3. **with F. Leoni, F. Pacella** Symmetry and spectral properties for viscosity solutions of fully nonlinear equations